



Tailoring Java Applications for Mac OS X

Session 404





Tailoring Java Applications for Mac OS X

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Java DTS Engineer



404

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Goals

- Make your Java Applications first-class citizens on Mac OS X
- Take advantage of Mac OS X-specific features
- Maintain cross-platform compatibility



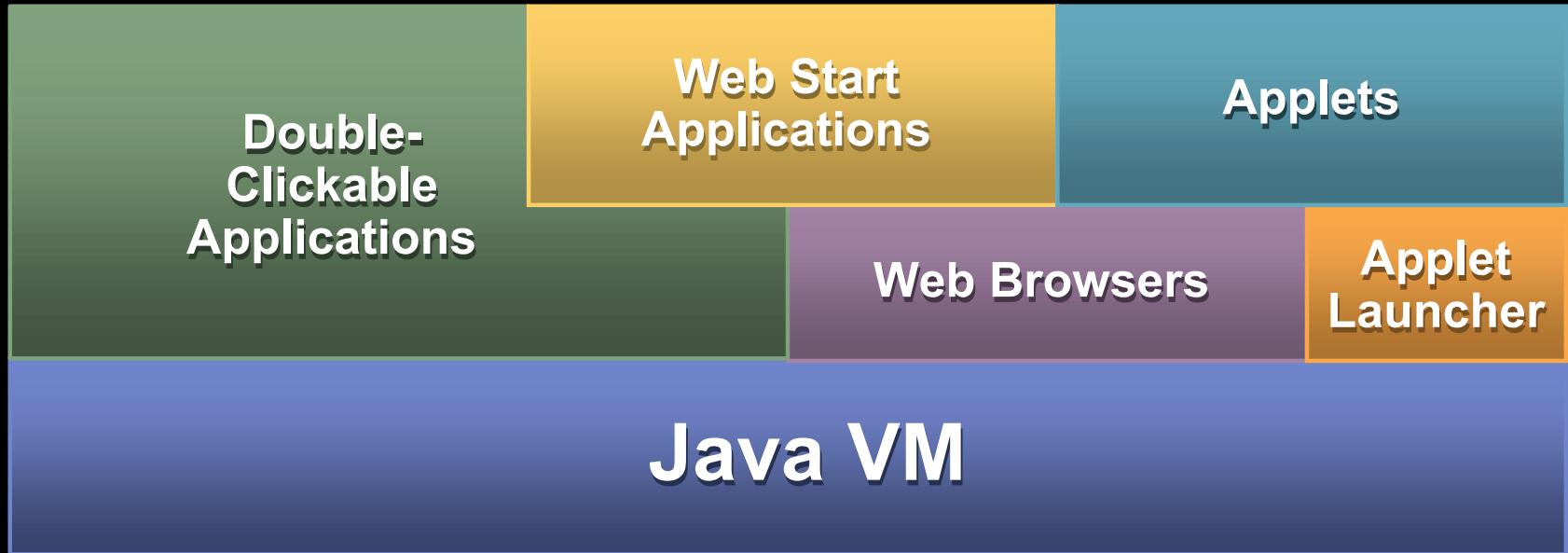
Overview

- Cross-platform Java development practices
- Deployment techniques
- Mac OS X-specific enhancements



Java on Mac OS X

End User



Java on Mac OS X

End User



Cross-platform Practices

- Menu shortcuts
- Contextual menus
- JDesktopPane
- Display considerations



Menu Shortcuts

- Do
 - `Toolkit.getMenuShortcutKeyMask()`
 - Defers to host platform
 - Less work, more accurate, portable
- Don't
 - Hardcode modifier keys
 - Windows-centric development often specifies `Event.CTRL_MASK`



Menu Shortcuts

```
JMenuItem jmi = new  
    JMenuItem("Copy");  
jmi.setAccelerator(  
    new KeyStroke(  
        KeyEvent.VK_C,  
        Toolkit.getDefaultToolkit().  
            getMenuShortcutKeyMask()));
```





Demo

Menu Shortcuts

Contextual Menus

- Do
 - Check `isPopupTrigger()`
- Don't
 - Check `isControlDown()` Or `BUTTON2_MASK`
- Recognition of Popup Trigger
 - Check on `mouseReleased()` and `mousePressed()` for compatibility



Contextual Menus

```
JLabel label = new JLabel("I have a popup menu!");
label.addMouseListener(new MouseAdapter() {
    // For Mac
    public void mousePressed(MouseEvent e) {
        evaluatePopup(e);
    }

    // For Windows
    public void mouseReleased(MouseEvent e) {
        evaluatePopup(e);
    }

    private void evaluatePopup(MouseEvent e) {
        if (e.isPopupTrigger()) {
            // show the popup menu...
        }
    }
});
```



JDesktopPanels and JInternalFrames

- MDI-based layout not “Mac-like”
- Do
 - Use separate JFrames
 - Use a single dynamic container (JBuilder, Project Builder)
- Don't
 - Use a JDesktopPanel for multiple documents
- JMenuBar concern





Demo

MDI vs. Frames

AWT/Swing Specifics

- Not all L&Fs are the same!
- Do
 - Use layout managers
 - Query UIManager, Toolkit for colors/icons
- Don't
 - Explicitly place your components
 - Explicitly set your own colors for custom components



Application Deployment

- Double-clickable applications
 - ProjectBuilder
 - MRJAppBuilder
 - Manual Bundle Construction
 - Follow BundleServices “Essentials” Docs
 - <http://developer.apple.com/techpubs/macosx/>
- Java Web Start
- Double-clickable JARs



Important Directories

- Java Home
 - `/Library/Java/Home/`
- System Java Extensions
 - `/Library/Java/Extensions/`
- User Java Extensions
 - `~/Library/Java/Extensions`



Important Directories

- Do
 - Put libraries into Extensions directories
 - [~]/Library/Java/Extensions
 - These will be preserved by updates
- Don't
 - Put libraries into/below Java Home
 - [JavaHome]/lib, lib/ext, etc.
 - These may be updated!



Basic Runtime Properties

- Numerous System Properties
- Specify in Terminal using “-D” flag
- Include in Info.plist of .app bundle
 - “Java” dictionary
 - “Properties” dictionary





Demo

Runtime Properties in Project Builder

Mac OS X Specifics

- Detecting a Mac/Aqua client
- Taking advantage of Aqua
- Mac-specific runtime properties
- MRJ Handler interfaces
- Bundled Mac OS X Services



Detecting a Macintosh Client

- `System.getProperty("mrj.version");`
 - `null` on all other platforms
 - Available to Applets!
- Check current look and feel from `UIManager`
 - `getSystemLookAndFeelClassName()`
 - `getLookAndFeel()`



Taking Advantage of Aqua

- Aqua on Mac OS X is free
 - Swing Default L&F, AWT is Aqua
 - Animated default button
 - Translucent menus
 - Genie effect
- Aqua Human Interface Guidelines
 - <http://developer.apple.com/techpubs/macosex/>



Aqua HI Guidelines

- Scrollbars in Aqua should always be visible
- Set Swing JScrollPane policy to match Aqua HI Guidelines

```
JScrollPane jsp = new JScrollPane();  
jsp.setVerticalScrollBarPolicy(  
    JScrollPane.VERTICAL_SCROLLBAR_ALWAYS);  
jsp.setHorizontalScrollBarPolicy(  
    JScrollPane.HORIZONTAL_SCROLLBAR_ALWAYS);
```



Mac Specific Runtime Properties

- .pkg/.app handling for File Dialogs
 - `com.apple.macos.use-file-dialog-packages`
 - Swing client properties for JFileChooser
 - AWT file dialog more familiar
- Small tabs
 - `com.apple.macos.smallTabs`
 - Matches HI Guidelines for two tab sizes



Mac Specific Runtime Properties

- Anti-aliasing for graphics/text
 - `com.apple.macosx.AntiAliasedTextOn`
 - `com.apple.macosx.AntiAliasedGraphicsOn`
 - Make use of Quartz features
- Hardware-accelerated graphics
 - Accelerate Swing and Java2D
- Lots more . . . see Tech Note 2031



Using a Macintosh Menu Bar

- Put Swing JMenuBar at top of screen
 - `com.apple.macos.useScreenMenuBar`
- What about apps with multiple JFrames?
 - Word processors, art apps, etc.
 - JMenuBar belong to a single JFrame
 - Create a shared global menubar with Actions





Demo

MenuManager Sample

Application Menu

- Three Interfaces (`com.apple.mrj.*`)
 - `MRJAboutHandler` (About <appname>)
 - `MRJPrefsHandler` (Preferences . . .)
 - `MRJQuitHandler` (Quit <appname>)
- Implement and Register
 - `handleAbout()`, `handleQuit()`,
`handlePrefs()`
 - `MRJApplicationUtils.registerXXXHandler()`
- Place special menu items conditionally



Cross-Platform Compatibility

- MRJToolkitStubs.zip
 - Linkable jar for non-Mac development
 - Include in classpath for build/run
- Changes will compile and run on other platforms





Mac OS X Services for Java

Scott Adler
Java Runtime Engineer

Bundled Mac OS X Services

- Carbon Text to Speech Framework
- Carbon Speech Recognition
- Cocoa Spelling Framework
- Both are additions to Swing!
 - Use with JTextArea, JTextField, etc.
- Get them at <http://connect.apple.com>





Demo

Mac OS X Speech and Spelling Services

Other Native Libraries

- JNI
 - Access to native code
 - Standard across platforms
 - You create glue code
- JDirect 3
 - Mac OS X specific
 - Easy access to your existing native libraries
 - No glue needed!



Old APIs

- 1.4 Drag and Drop is much improved
 - MRJ DnD will be deprecated in Jaguar
 - Not supported in 1.4
 - Mac OS X-specific extensions planned
- MRJFileUtils
 - Carryover from Mac OS 9
 - Planned for deprecation
 - Replacements are being evaluated for 1.4



Summary

- Use Aqua!
- Use cross-platform programming techniques
- Conditionally/Dynamically add Mac OS X features



Links and Resources

- Speech and Spelling
 - Java section at <http://connect.apple.com>
- Apple Java Developer Resources
 - <http://developer.apple.com/java>
 - New Documentation!
- Java-dev Mailing List
 - java-dev@lists.apple.com
- Developer Technical Support
 - dts@apple.com



The Tech Notes! The Samples!

<http://developer.apple.com/...>

- Java Runtime Properties for Mac OS X
<.../technotes/tn/tn2031.html>
- Tailoring Java Applications for Mac OS X
<.../technotes/tn/tn2042.html>
- Updated MRJToolkitStubs.zip
.../samplecode/Sample_Code/Java.html



Roadmap

405 Java Web Services:
XML, SOAP, etc.

Room C
Wed., 10:30am

406 Java Virtual Machine Internals:
Take a look under the hood

Room C
Wed., 3:30pm

407 Java Performance:
Make your applications faster

Room C
Fri., 9:00am

FF003 Java Feedback Forum:
Talk to us

Room J1
Wed., 5:00pm



Who to Contact

Alan Samuel

Java Technologies Evangelist

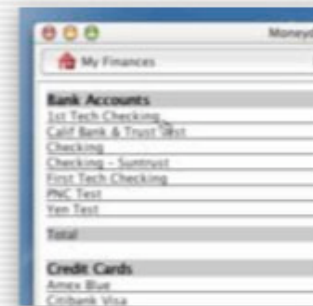
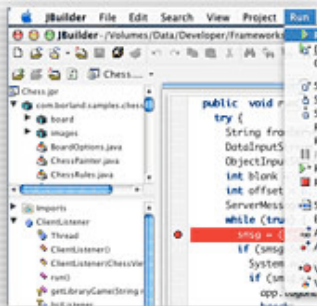
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Q&A



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